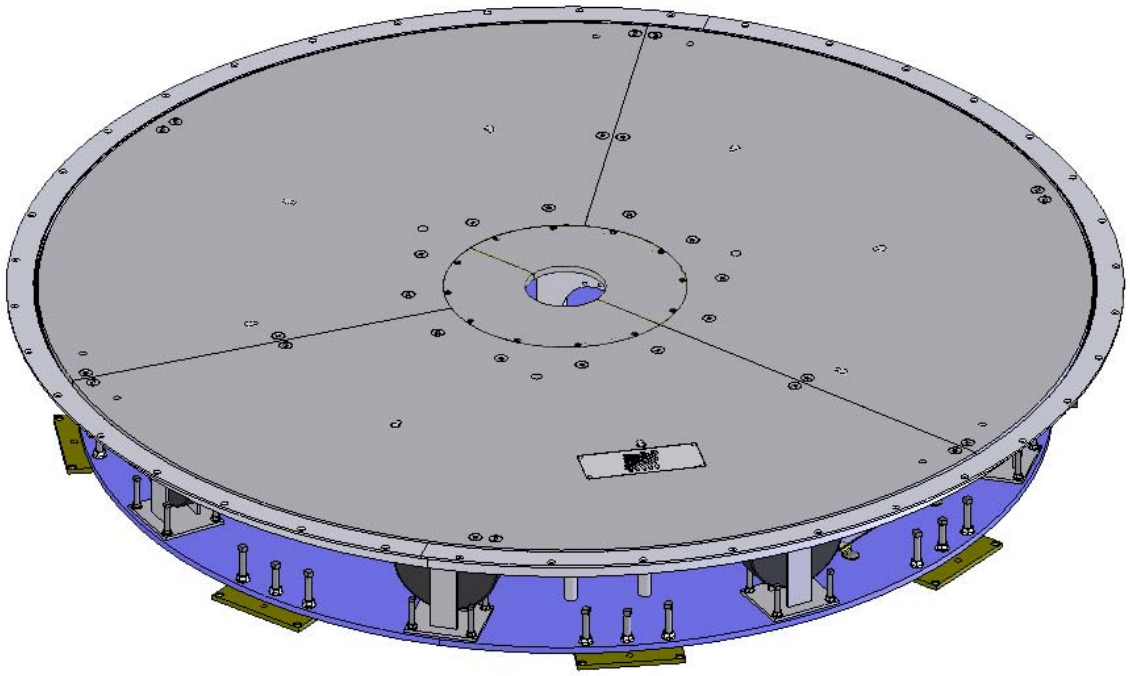
Model 2187

Electric-Powered Turntable

2-Meter, 3-Meter

User Manual



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Revision Record | MANUAL,2187 | Part #399789, Rev. C

Revision	Description	Date
A	Initial Release	June, 2007
B	Added 3.0 turntable information and drawings	February, 2008
C	Rebrand	July, 2008

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Notes, Cautions, and Warnings

	Note: Denotes helpful information intended to provide tips for better use of the product.
CAUTION	**Caution: Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.**
WARNING	**Warning: Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures.**

See the ETS-Lindgren *Product Information Bulletin* for safety, regulatory, and other product marking information.

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1.0 Introduction

The **ETS-Lindgren Model 2187 Turntable** is an electric-powered turntable platform system designed for use with the Model 2090 Multi-Device Controller (or next generation ETS-Lindgren controller, if applicable) for EMI compliance testing. The Model 2187 is available in 2.03-meter and 3.03-meter sizes, both designed for indoor or outdoor use.

The top of the turntable is conductive with a continuous ground brush to electrically couple it to the ground plane. The ground brushes are attached directly to the chamber floor by the floor flange, and are in continuous contact with the turntable top. The brushes point downward from the floor flange.

Both models utilize a pinion and gear drive with a gear reducer and electric motor located beneath the platform. The bearing on which the turntable rotates has the drive teeth cut directly on the outside and will easily support most Equipment Under Test (EUT). Support for the turntable includes casters that aid in the support of cantilevered loads on the outside of the turntable.

The turntable top is sectional to provide easy access if service is required. On standard models, a 15-cm hole is provided in the center of the turntable to accommodate customer supplied cabling to and from the EUT.

To prevent over-travel of the turntable in either direction of movement, hard limits are provided in the form of pins that actuate switches located below the tabletop. These pins allow limits to be set and allow as much as two full rotations. Rotation speed can be varied from a controller (not included) or through the IEEE-488 interface bus.

Standard Configuration

TURNTABLE ASSEMBLY

Featuring continuous or non-continuous operation, the turntable assembly includes:

- 230 VAC electric motor unit
- Convenient rotational limit adjust switches
- Ground ring assembly with ground brush and floor flange
- 10-meter fiber optic cable

Additionally, the turntable is infrared compatible, and can be used with an optional ETS-Lindgren Infrared Remote Controller (IR remote). For more information on using an IR remote, see *Infrared Remote Controller* on page 8.

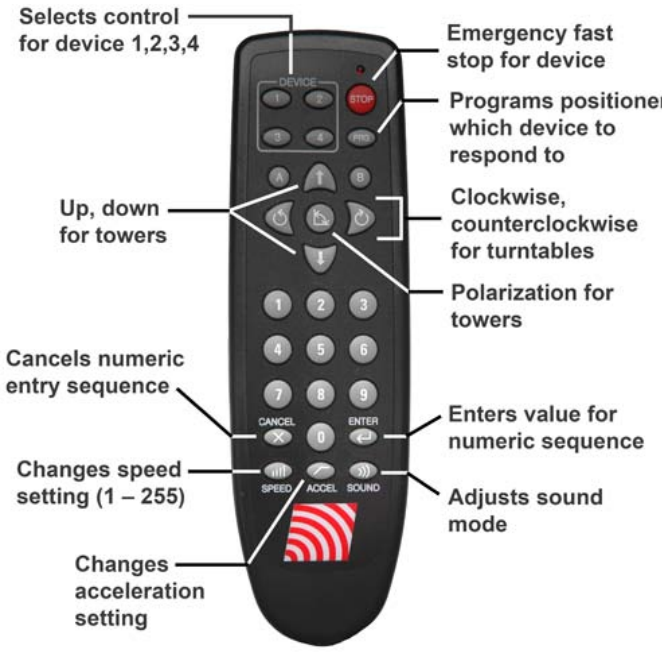
SHIELD ROOM FEED-THROUGH

Routes the fiber optic control cable from the control room to the shield room, maintaining satisfactory shielding attenuation. The unit is made of brass for conductivity and provides attenuation of greater than 100 dB at 10 GHz. A single 22.25-mm (0.875-in) hole is required for mounting.

Optional Items

INFRARED REMOTE CONTROLLER

The Model 2187 is infrared compatible, and can be used with a universal remote control programmed to a specific protocol, such as the ETS-Lindgren Infrared Remote Controller (IR remote).



The IR remote communicates with an infrared receiver in the Model 2187 motor base through an IR repeater installed in the floor near the turntable. See *IR Repeater Installation* on page 23 for instructions on installing an IR repeater.

SLIP RING

Allows continuous rotation of the turntable through the latest technology in mercury slip rings, and either Schuko or NEMA connectors can be ordered with the slip ring. The current rating for the standard electrical assembly is 20 amperes. Contact ETS-Lindgren for custom requirements on slip rings.

EUT Power Outlets

Receptacles are usually mounted on the base of the turntable at the center axis point. These receptacles can be custom mounted, flush with the tabletop on some turntables. Contact ETS-Lindgren for information.

Mounted Line Impedance Stabilization Network

A Line Impedance Stabilization Network (LISN) can be mounted to the underside of some turntables. This option is only practical on larger turntables with sufficient clearance.

Additional Fiber Optic Cables

Additional lengths of fiber optic cable may be ordered.

ETS-Lindgren Product Information Bulletin

See the ETS-Lindgren *Product Information Bulletin* included with your shipment for the following:

- Warranty information
- Safety, regulatory, and other product marking information
- Steps to receive your shipment
- Steps to return a component for service
- ETS Lindgren calibration service
- ETS Lindgren contact information

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2.0 Maintenance

WARNING

Before performing any maintenance, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.

Regularly inspect all equipment and conduct scheduled maintenance in accordance with the factory recommendations provided.

BEFORE SERVICING: CONTACT ETS-LINDGREN (+1.512.531.6400)—Servicing or modifying the unit without ETS-Lindgren authorization may void your warranty. If an attempt to service the unit must be made, disconnect all electrical power prior to beginning. Voltages exist at many points within the instrument that could, if contacted, cause personal injury. Only trained service personnel should perform adjustments and/or service procedures upon this instrument. Capacitors inside this instrument may still be charged even when the instrument is disconnected from the power source.

Recommended Maintenance Schedule

Regular maintenance will prolong the effective operation and reliability of your turntable. Follow the recommended schedule for 6-month and 12-month service.

CAUTION

Do not perform maintenance while the turntable is operating.

6-Month Service

- Lubricate the casters with good quality bearing grease.
- Check the gearbox for fluid leakage. A collection of slight film is normal, but puddles of fluid are not normal. The gearbox is lubricated and sealed at the factory. Under normal conditions, the gearbox should not require servicing during its life.

12-Month Service

- Lubricate the main bearing race with a grease gun containing good quality bearing grease. The grease fittings are located inside the race, 90 degrees apart, beneath the top. Three discharges from the grease gun in each fitting are adequate.

- Lubricate the gear teeth with good quality grease.

Replacement and Optional Parts

Following are the part numbers for ordering replacement or optional parts for the Model 2187 Turntable.

Part Description	Part Number
Turntable assembly	For a list of all turntable parts, see the drawings located in the back of this manual.
IR Remote Controller	707030
NEMA connectors for slip ring	103441
Schuko connectors for slip ring	103351

Service Procedures

For the steps to return a system or system component to ETS-Lindgren for service, see the *Product Information Bulletin* included with your shipment.

3.0 Specifications

Electrical Specifications

Drive Speeds:	Variable
Nominal AC Voltage:	208–230 VAC
Input Frequency:	50/60 Hz
Current Rating:	15 amp service
Current Draw:	< 10 amps
RPM:	0.5–2.0
Phase:	Single (1)

Mechanical Specifications

Diameter:	2.03 meters	3.03 meters
Minimum Height:	27.63 cm 10.88 in	27.63 cm 10.88 in
Maximum Height:	31.57 cm 12.43 in	31.57 cm 12.43 in
Required Pit Diameter:	202.56 cm ± .63 cm 79.75 in ± .25 in	302.56 cm ± .63 cm 119.12 in ± .25 in
Distributed Load Rating:	910 kg 2000 lb	1100 kg 2500 lb

Distributed Load Rating applies when:

- Load is evenly distributed on top;
- No point loads under 0.19 sq m (2.0 sq ft) should exceed 100 kg (220 lb);
- And not over 28.5 kg (62.8 lb) should be applied to a 45-degree segment at the table outer edge.

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4.0 Turntable Installation Considerations

WARNING

Before assembling, installing, or connecting any components, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.

Before You Begin—Precautions

Read this manual completely before starting installation. This equipment should be installed and operated only by qualified personnel.

Do not attempt to service unless qualified to do so. As with any electrical equipment, make sure unit electrical power has been disconnected and secured when performing scheduled maintenance or adjustments.

Do not make any modifications to this unit without consulting the factory directly.

Regularly inspect all equipment for loose fasteners and wear. Conduct scheduled maintenance in accordance with the factory recommendations provided.

Only use replacement parts and fasteners ordered directly from the factory.

Stay clear of all moving components on this equipment.

Do not operate turntable while someone is physically on the turntable top.

Do not, at any time, place hands or feet in the vicinity of the drive pinion on the turntable.

Power and Signal Lines

CONDUIT

Power and signal line paths should be planned in advance. Conduit should be in place before pouring concrete or installing the ground plane. Consider the size of the cable bundle when selecting conduit diameter.

ELECTRICAL CONSIDERATIONS

CAUTION

Electrical connection is subject to local electrical codes, and should only be performed by a qualified electrician.

A qualified and licensed electrical contractor should install power lines, and the installation should comply with all applicable regulatory agencies. A dedicated circuit should be used, with the shortest distance possible between the power source and the turntable.

For more information on electrical installation, see page 17.

ACCESS

An access area beneath the turntable is advisable for large diameter installations. A service switch should be installed to deactivate the turntable during service.

Outdoor Installations

DRAINAGE

A centerline drain of at least 15 cm (6 in) must be installed to provide proper drainage during rainstorms and other moisture-collecting situations.

COLD CLIMATE CONDITIONING

The oil used in the gear assemblies will congeal at 2°C (28°F). Turntables operated in these temperatures should include a heat source or dehumidifier, or both.

5.0 Electrical Installation

WARNING

Before assembling, installing, or connecting any components, follow the safety information in the ETS-Lindgren Product Information Bulletin included with your shipment.

CAUTION

Electrical installation must be performed by a qualified electrician, and in accordance with local and national electrical standards.

Make sure the power is off and secured before proceeding.

The Model 2187 Turntable is configured to operate using 208-230 VAC, single phase, 50/60 Hz service. It is recommended to operate at this voltage level to reduce the surge currents necessary to power an electric motor.

1. The branch circuit supplying power to the motor base should be protected from excess current according to local electrical codes. An integral circuit breaker is mounted inside the main bearing on one of the bearing support blocks. The circuit breaker is specifically designed for the inductive load presented by the electric motor.

2. Make sure the conductor size is adequate for the motor load and the distance from the mains source. Improperly sized conductors will lead to a high voltage drop in the power conductors and cause reduced starting torque and premature motor failure.

3. The motor base assembly is provided with a non-terminated flexible conduit with input power leads exposed. The flexible conduit is to be terminated into a junction box fitted on or near the motor base. Terminate the power leads of the motor base assembly according to local electrical code requirements. Following is the conductor color code:

   Brown: AC high
   Blue: AC neutral
   Green/Yellow: Protective earth/safety ground

Connect the fiber optic control cable and install the power connection according to local electrical code. See the controller manual for information on connecting the fiber optic cable. After the fiber optic cable is installed, secure it with a wire tie to one of the leveling screws.

To feed the fiber optic connectors through a waveguide in the chamber, cables are included to connect from the feedthroughs on the penetration panel to the controller and motor base.

6.0 Assembly and Installation

WARNING

Before assembling, installing, or connecting any components, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.

Prior to assembly and installation, review the drawings located in the back pocket of this manual.

Proper installation of the turntable directly affects performance. The installation of turntables two meters and larger will be performed by factory installation specialists or individuals authorized by ETS-Lindgren to perform such work. The following installation information is included only to provide an informational overview of the installation process.

1. Uncrate all parts and check for shipping damage. Create a clear area to safely assemble the turntable unit. Do not discard any packing material until unit is fully assembled.

2. Remove the bolts that attach the top onto the turntable drive assembly. Make note of the placement of each top section as it is removed.

CAUTION

Only qualified personnel should use a forklift or other lifting machinery to lift the turntable assembly.

3. Using a forklift or other appropriate lifting machinery, place the turntable bottom or bearing support section into position. If the turntable is to be installed in a pit, center and level the assembly.

CAUTION

Make sure power is off and secured before proceeding.

4. The drawings in the back of this manual show the placement of floor plates and leveling screws to anchor and level the turntable. Anchor the turntable through the attachment holes using the concrete expansion bolts provided. After installing the floor plates and leveling screws, level the entire turntable by adjusting all the leveling screws between and under the casters, and in the center section of the turntable.

5. Tighten all lock nuts accompanying the leveling screws to lock the height of the turntable into place.

6. Connect the fiber optic control cable and install the power connection according to local electrical code. The standard power configuration is 230 VAC 50/60 Hz.

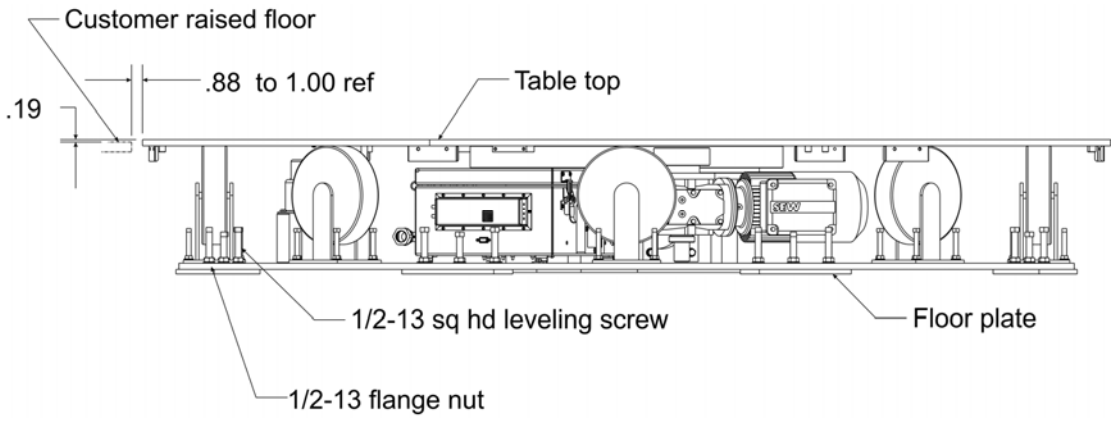
CAUTION

Keep all body parts away from the drive pinion when the turntable is energized.

7. Follow the instructions in the next section, *Floor Flange Installation in a Paneled Floor*, to install the ground ring assembly.

8. Reinstall the top section removed in step 2 of these instructions.

Floor Flange Installation in a Paneled Floor



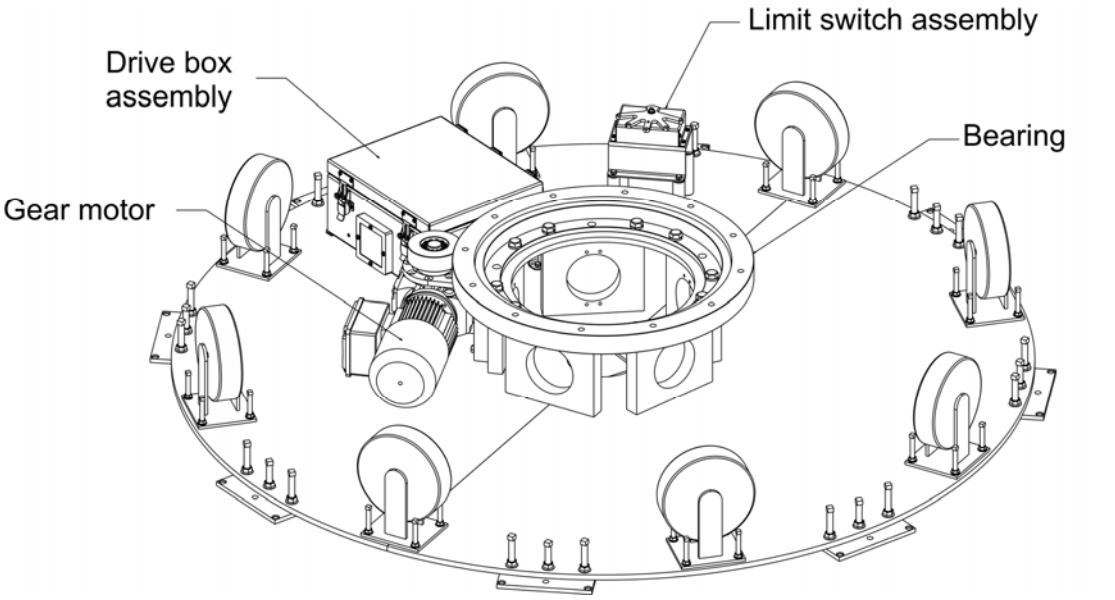
The ground ring assembly includes a floor flange with a mounted brush ring that interfaces with the contact ring mounted beneath the turntable top. The floor flange provides constant electrical contact with the ground plane.

Mounting methods vary according to user specifications. Clearance holes are provided at evenly-spaced intervals along the outside perimeter of the floor flange to attach to a customer-supplied ground plane. These instructions describe installation for a paneled floor. For concrete pit mounting instructions, see *Floor Flange Installation in Concrete Pit* on page 22.

Installing the ground ring assembly requires these tools:

- 1/4-in spacers (3)
- Hand drill
- 5/32-in drill bit
- #3 Phillips drive bit
- Small square
- #14 x 1 wood/metal screws

The turntables each have two floor flange pieces. All flanges are pre-cut at the factory for a drop-in fit.



1. Lay the floor flange into the opening of the raised floor and push outward to the diameter of the opening.
2. Attach the turntable top onto the center bearing with the hardware provided.
3. Using a pipe clamp and 1/4-in Allen wrenches or 1/4-in pin, place a spacer between the turntable and floor flange starting in three places in the center or on the flange.

4. Once tension is placed on all three wrenches, drill a 5/32-in hole through the counter-sunk holes in the floor flange. Drill completely through the panel and place screws into the holes.

5. Continue working around the floor flange, completing two or three holes at a time.

Make sure that a 1/4-in gap between the turntable top and the mounted brush ring be held as close as possible so that the grounding brushes seat properly. Also, make sure the flange ends are flush with each other.

6. Continue mounting until all screws are installed. Some screws may fall between the floor panel joints. Try to position the flanges, making sure as few screws hit these points as possible, and making sure that the first or last hole in the flange is not too close to one of these joints. Trim the top floor joint strips to fit up against the flange.

Floor Flange Installation in a Concrete Pit

Installing in a concrete pit is the same as a paneled floor, with the exception of the mounting hardware. Instead of the #14 x 1-in square socket flat head screws, use 1/4 x 1.75-in Phillips flat head concrete anchors.

These tools are required for the next stage of installation:

- 1/2-in hammer drill
- 3/16 x 3.5-in hammer drill bit, at minimum
- Vacuum to clean inside the drilled holes for maximum thread engagement

When drilling holes, be aware of buried conduit and pit drainpipes. Drill 3/16-in holes, two inches minimum depth.

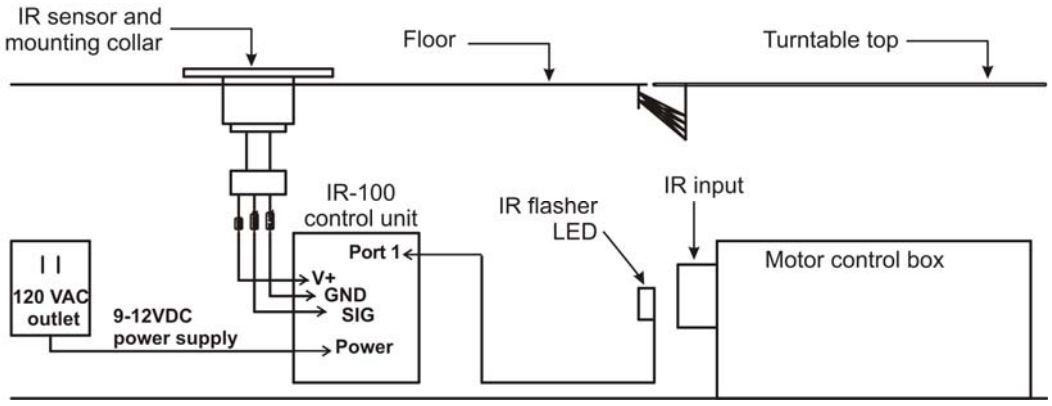
INSTALLATION ASSEMBLY COMPONENTS

- Infrared sensor
- Mounting collar
- IR-100 control unit
- IR flasher LED
- 9–12VDC power supply
- Connection cable
- Flathead mounting screws

REQUIRED TOOLS FOR INSTALLATION

- Electric drill
- 1-in hole saw to create a
- 1/16-in drill bit
- Small flat blade screwdriver
- Phillips #2 bit driver
- Adhesive tape

INSTALLATION STEPS



1. Choose a location for the IR infrared sensor that is away from traffic.
2. Using a 1-in hole saw, cut an opening in the floor for the IR sensor.
3. Connect the **V+**, **GND**, and **SIG** wires to the IR sensor as shown in the diagram, and feed the cable through the hole.

4. Use the 1/16-in drill bit and four flathead mounting screws to mount the IR sensor collar.

5. Connect the **V+**, **GND**, and **SIG** wires from the IR sensor to the IR-100 control unit as shown in the diagram.

6. Using adhesive tape, attach the IR flasher LED directly over the IR input on the motor control box.

7. Connect the IR flasher to port 1 on the IR-100 control unit.

8. Plug the 9–12VDC power supply into the power connector on the IR-100 control unit, and then plug the power supply into a 120 VAC outlet.

7.0 Operation

WARNING

Before placing into operation, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.

With the assembly of the turntable complete, the Model 2090 Multi-Device Controller (or next generation ETS Lindgren controller, if applicable) must be connected to the unit and power applied to both the motor base and controller. See the controller manual for complete information on connecting the fiber optic cable and operating the controller. A manual is included with each controller and is also available for download from www.ets-lindgren.com.

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Appendix A: List of Assembly Drawings

Following is a list of the assembly drawings located in the back of this manual. Prior to assembly and installation, review the drawings. Refer to the drawings during assembly and installation for detailed information.

- **2187–2.0:** 2-meter turntable (3 pages)
- **2187–3.0:** 3-meter turntable (2 pages)

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Appendix B: Warranty

See the *Product Information Bulletin* included with your shipment for the complete ETS-Lindgren warranty for your Model 2187 Turntable.

DURATION OF WARRANTIES FOR MODEL 2187

All product warranties, except the warranty of title, and all remedies for warranty failures are limited to two years.

Product Warranted	Duration of Warranty Period
ETS-Lindgren Model 2187 Turntable	2 Years

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Appendix C: EC Declaration of Conformity

The EC Declaration of Conformity is the method by which ETS-Lindgren, L.P. declares that the equipment listed on this document complies with the EMC Directive (EEC/89/336) and Low Voltage Directive (EEC/73/23), including applicable amending directives.

Factory	**Issued by**
ETS-Lindgren, L.P.	ETS-Lindgren, L.P.
1301 Arrow Point Drive	1301 Arrow Point Drive
Cedar Park, TX, USA 78613	Cedar Park, TX, USA 78613

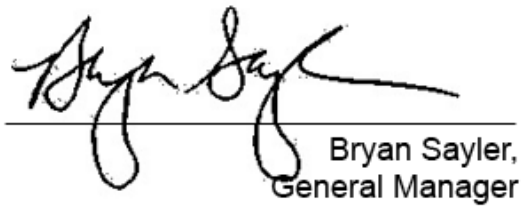
The products listed below are eligible to bear the CE mark:

– Model 2187 Electric Powered Turntable, 2-Meter and 3-Meter with 2088 style motor base

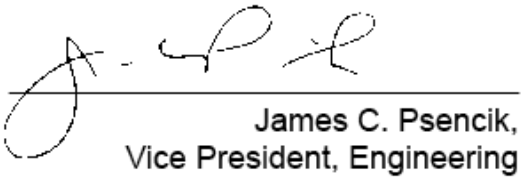
APPLICABLE REQUIREMENTS

Standard	**Criteria**
EN 55011	Group 1, Class B
EN 61000-4-2:1995	Level 2/3 (4/8 kV)
EN 61000-4-3:1997	Level 2 (3 V/m)
EN 61000-4-4	Level 2 (1/0.5 kV)
ENV 50204:1996	Level 2 (3 V/m)
EN 61000-4-5:1995	Level 3 (2/1 kV)
EN 61000-4-11:1994	2 kV
EN 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use

AUTHORIZED SIGNATORIES



Bryan Sayler,
General Manager



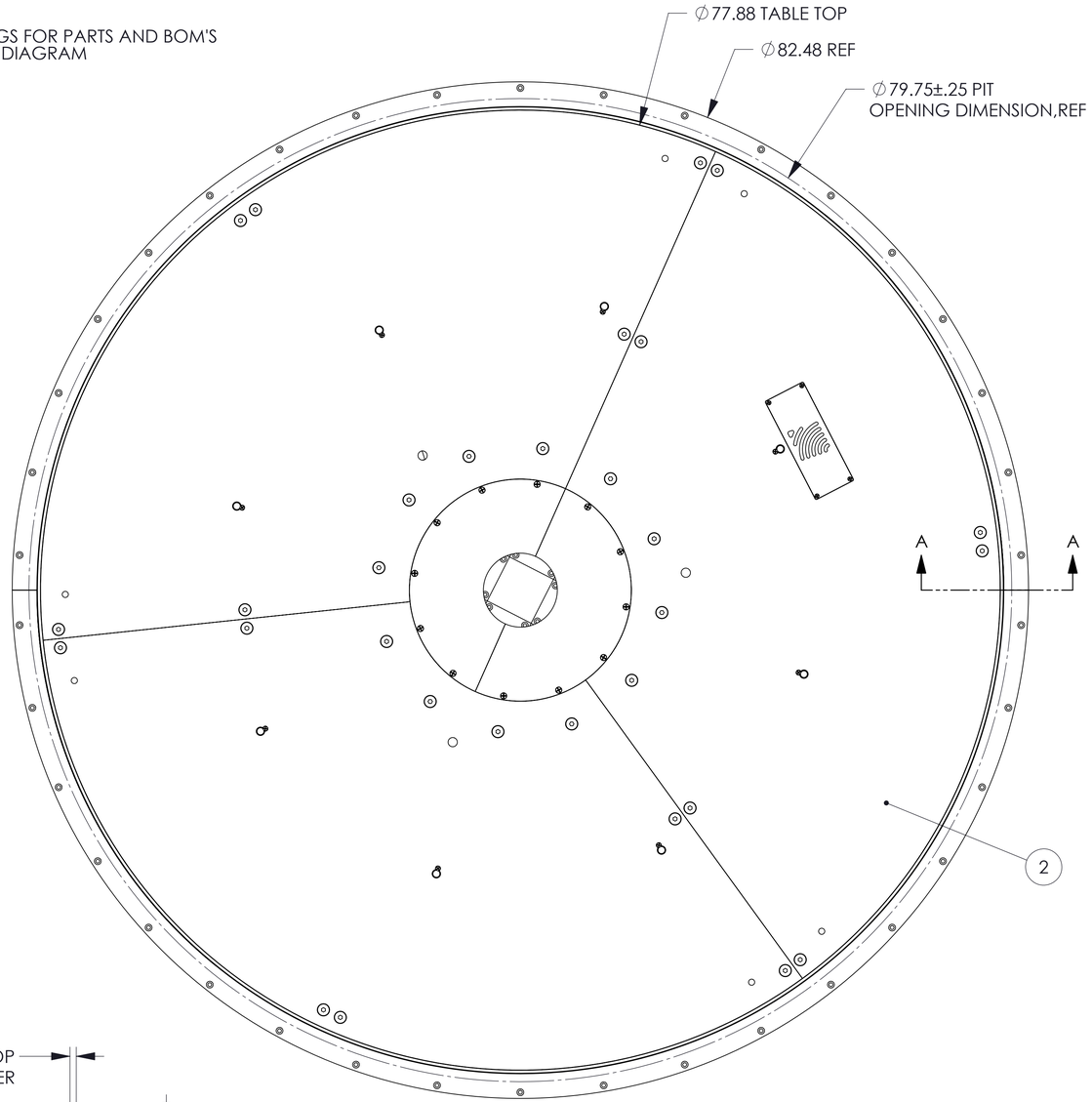
James C. Psencik,
Vice President, Engineering

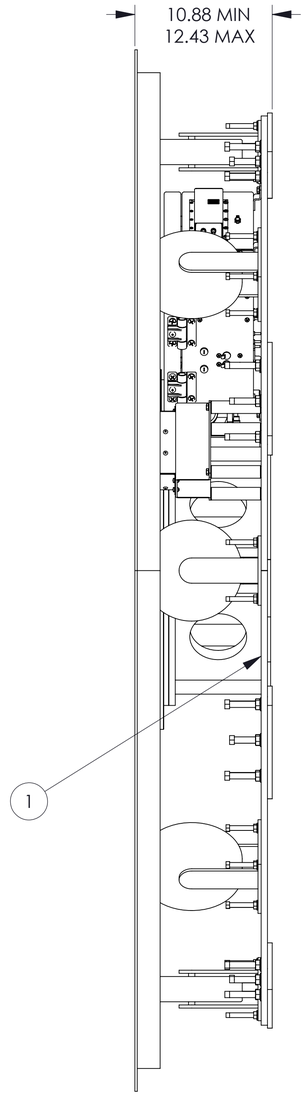
The authorizing signatures on the EC Declaration of Conformity document authorize ETS-Lindgren, L.P. to affix the CE mark to the indicated product. CE marks placed on these products will be distinct and visible. Other marks or inscriptions liable to be confused with the CE mark will not be affixed to these products. ETS-Lindgren, L.P. has ensured that appropriate documentation shall remain available on premises for inspection and validation purposes for a period of no less than 10 years.

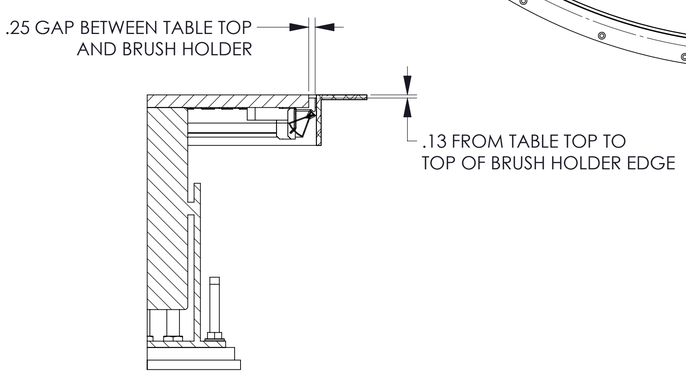
REF DRAWING

1. REFER TO SUB ASSY DRAWINGS FOR PARTS AND BOM'S
2. SEE P/N 398797 FOR WIRING DIAGRAM

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
5190	A	RELEASED	10/27/06	RBG







SECTION A-A
SCALE 1 : 3

ITEM#	QTY	PART#	DESCRIPTION
3	1	111343	KIT,SHIPPING,2187-2.0 TURNTABLE
2	1	111330	SUB-ASSY,TOP,TURNTABLE,2187-2.0
1	1	111329	TURNTABLE,2187-2.0

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:
DECIMALS: X.XX ± .015, X.XXX ± .005
ANGLES: ± .5

	INITIAL	DATE
DRAFTING		
ENGINEERING	RBG	10/27/06

FINISH: NONE

ETS•LINDGREN™
An ESCO Technologies Company

TITLE: TURNTABLE,2M,MD,ELECTRIC,METAL TOP

PROPRIETARY INFORMATION
ANY DUPLICATION OF THIS DOCUMENT, WHOLE OR IN PART, WITHOUT EXPRESS WRITTEN PERMISSION OF ETS•LINDGREN IS PROHIBITED.

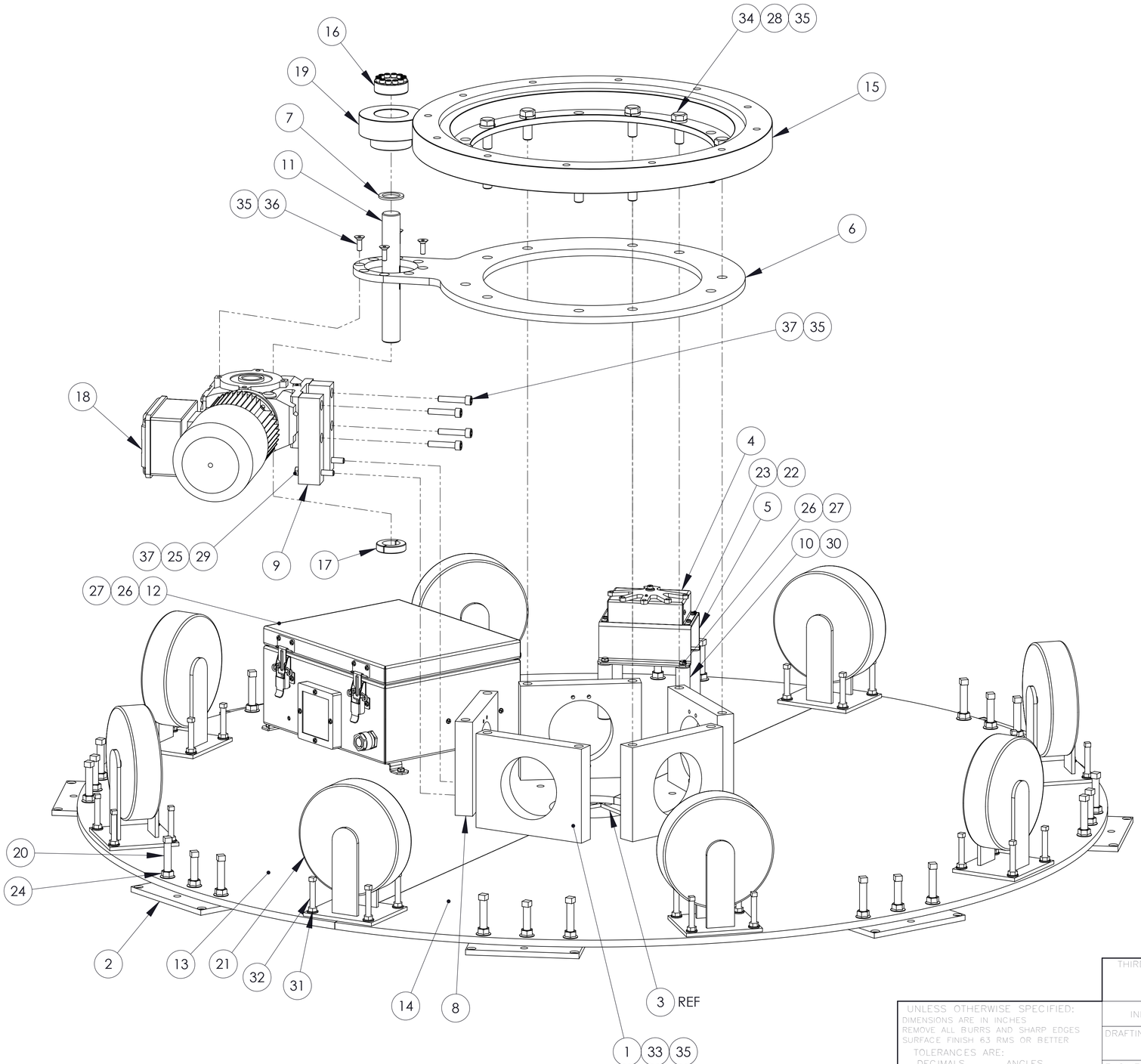
SIZE	SCALE	DWG. NO.	REV.
D	1:6	2187-2.0	A

DO NOT SCALE DRAWING

SHEET 1 OF 1

REF DRAWING

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
5190	A	RELEASED	10/27/06	RBG



ITEM#	QTY	PART#	DESCRIPTION
44	1	398797	WIRING DIAGRAM,2187 ELECTRONIC ASSY (NOT SHOWN)
43	20	890983	SLEEVING,SLIT-CONVOLUTED,PE,1/4" ID (NOT SHOWN)
42	4	708040	FIBER OPTIC CABLE LIMIT SWITCH 1.5M (NOT SHOWN)
41	1	675294	CABLE,ENCODER,8 METER SHIELDED (NOT SHOWN)
40	1	890191	CONN 90DEG CONDUIT FLX (NOT SHOWN)
39	1	920228	LABEL,EQUIPMENT CHECKED (CAL) (NOT SHOWN)
38	25	890192	CONDUIT,FLEX 1/2" RF SHIELDED (NOT SHOWN)
37	4	930997	SCREW,M10X1.5X50,SH,CAP,SS,DIN 912-A2
36	4	930734	SCREW,M8 X 1.25 X 25mm,FLAT,SOCKET,SS
35	.01	920081	LOCTITE THREAD LOCKING #242 31 50MI
34	10	910620	BOLT,5/8-11 X 1-3/4,HEX,GR5,ZN
33	10	910619	SCREW,5/8-11 X 1.25,SH,FLAT,SS
32	32	910616	SCREW LEVELING 1/2-13 X 3 SQ HD CU
31	32	910615	NUT,3/8-16,HEX,ZINC,SERRATED FLANGE
30	4	910603	SCREW,1/4-20 X 7/8,PHIL,FLAT,SS
29	2	910599	BOLT,3/8-16 X 2-1/2,HEX,SS
28	10	910539	WASHER,5/8,LOCK,STL,ZN,SPLIT
27	8	910456	WASHER,1/4,LOCK,SS,SPLIT
26	8	910436	BOLT,1/4-20 X 1/2,HEX,SS
25	2	910411	WASHER,3/8,LOCK,STL,ZN,SPLIT
24	24	910367	NUT,1/2-13,HEX,SERRATED FLANGE,ZN
23	4	910244	SCREW,8-32 X 3/8,PHIL,BIND,SS
22	4	910228	WASHER,#8,LOCK,SS,SPLIT
21	8	890668	CASTER 3A886 GRAINGER
20	24	890238	SCREW LEVELING 1/2-13 X 3 SQ HD CU
19	1	880315	PINION,16T,4DP
18	1	880314	GEARBOX,SEW EURODRIVE
17	1	880216	SHAFT COLLAR,1 1/4 BORE,TWO PIECE,STEEL
16	1	880215	LOCKING COUPLER TLK 200 X 1.25 BROWNING
15	1	880044	BEARING,25.15 OD.,99T
14	1	111332	BASE PLATE,LOWER,2187 TURNTABLE
13	1	111331	BASE PLATE,GEAR BOX,2187 TURNTABLE
12	1	110932	DRIVE,TURNTABLE,2187
11	1	110917	SHAFT,DRIVE,GEARBOX,2187
10	4	110901	STANDOFF,MECHANICAL LIMIT SWITCH ASSY
9	2	110898	BLOCK,GEARBOX TORQUE
8	1	110897	SUPPORT,BEARING/GEARBOX
7	1	110896	SPACER,PINION
6	1	110895	MOUNT PLATE,GEARBOX
5	1	109307	BRACKET,LIMIT SWITCH CASE
4	1	108758	ASSY,MECHANICAL LIMIT SWITCH,MOTORBASE
3	4	106982	FLOOR PLATE SPACER 3, MODEL 2088
2	8	106789	TIE PLATE 2M 2087
1	4	105812	BLOCK 1 BEARING 2087 2M TURNTABLE

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:
DECIMALS: X.XX ± .015, X.XXX ± .005
ANGLES: ± .5

	INITIAL	DATE
DRAFTING		
ENGINEERING	RBG	10/27/06

FINISH: NONE

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An ESCO Technologies Company

TITLE: TURNTABLE,2187-2.0

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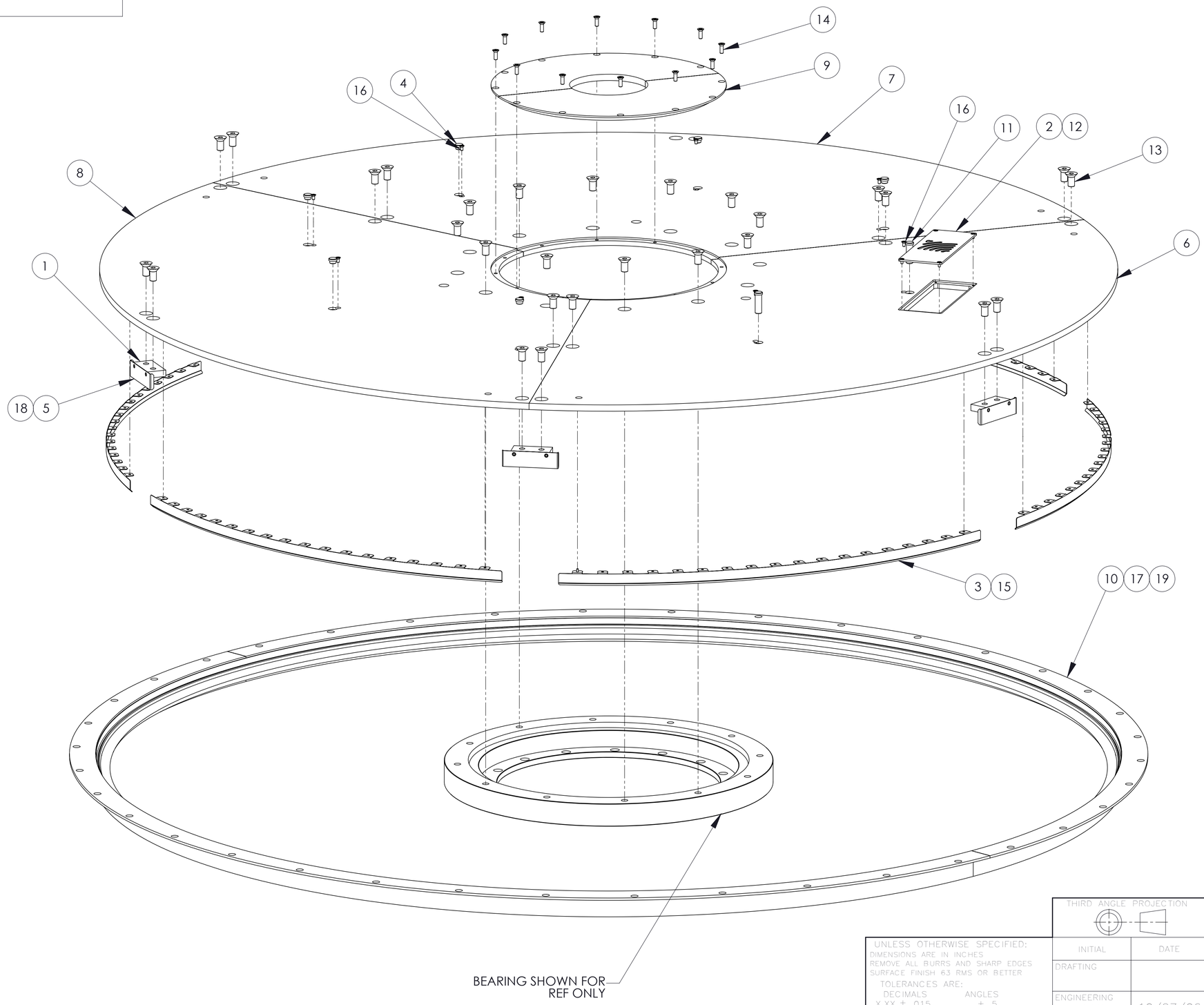
SIZE	SCALE	DWG. NO.	REV.
D	1:4	111329	A

DO NOT SCALE DRAWING | SHEET 1 OF 1

REF DRAWING

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
5190	A	RELEASED	10/27/06	RBG



ITEM#	QTY	PART#	DESCRIPTION
20	1	920192	LABEL,WARNING,GEARS BELOW TURNTABLE (NOT SHOWN)
19	74	910652	SCREW FH PHL ZN TAPTITE 6-32 X 3/8
18	12	910173	SCREW,6-32 X 3/8,PHIL,FLAT,SS
17	6	109468	ASSY,BRUSH/HOLDER MODIFICATION
16	8	910930	SCREW,10-32 X 3/8,PHIL,FLAT,SS
15	108	910714	SCREW,6-32 X 1/4,PHIL,BIND,TAPTITE
14	12	910440	SCREW,1/4-20 X 3/4,PHIL,FLAT,SS
13	30	910413	SCREW,1/2-13 X 1.00,SH,FLAT,ZN
12	4	910241	SCREW,8-32 X 3/8,PHIL,FLAT,SS
11	2	880316	PIN,CLEVIS,SS,1/2"O.D. X 1.5" LONG
10	2	705421	FLOOR FLANGE,TURNTABLE,2.03m,AL
9	2	111333	RING,SPLIT,2187 TURNTABLE
8	1	110891	TOP,SECT 3,2187-2.03/C24391
7	1	110890	TOP,SECT 2,2188-2.03/C24391
6	1	110889	TOP,SECT 1,2187-2.03/C24391
5	6	110405	CONTACT FLAT,BRUSH,TURNTABLE
4	6	110059	PLUG,HOLE,TABLE TOP
3	6	109333	CONTACT STRIP,BRUSH,TURNTABLE
2	1	108925	COVER,ACCESS
1	9	105813	TAB,TOP,2087

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:
DECIMALS: X.XX ± .015, X.XXX ± .005
ANGLES: ± .5

	INITIAL	DATE
DRAFTING		
ENGINEERING	RBG	10/27/06

FINISH: NONE

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TITLE: SUB–ASSY,TOP,TURNTABLE,2187–2.0

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D	1:4	111330	A

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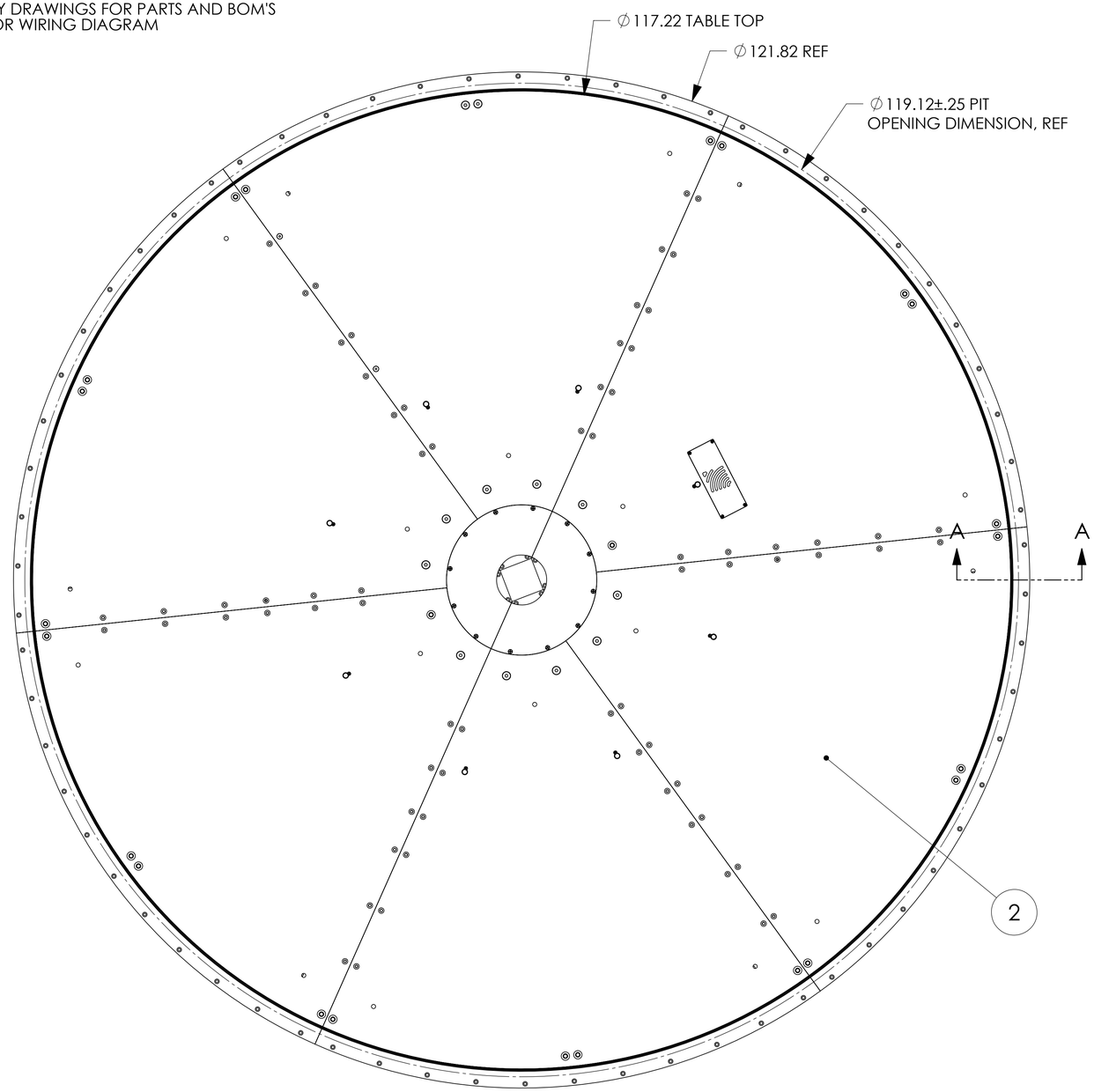
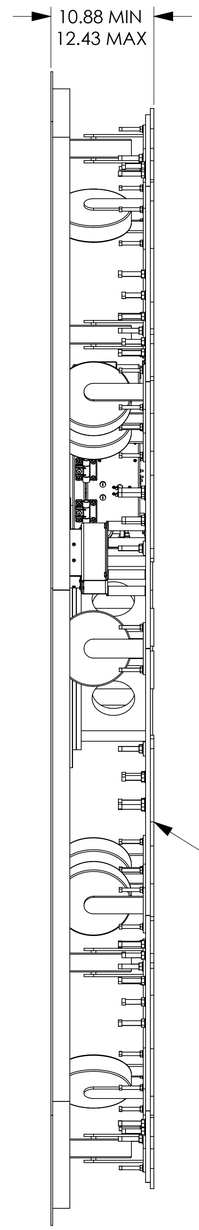
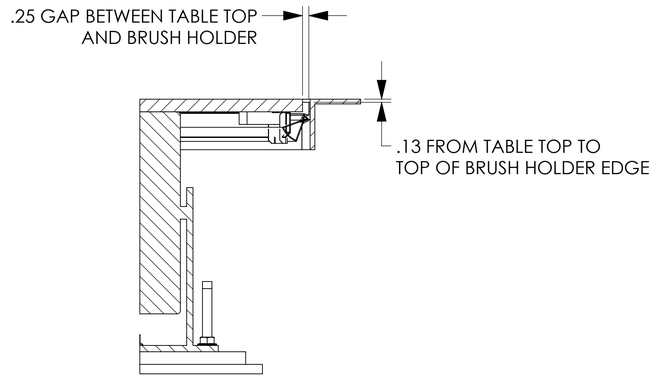
REF DRAWING

1. REFER TO SUB ASSY DRAWINGS FOR PARTS AND BOM'S
2. SEE P/N 398797 FOR WIRING DIAGRAM







SECTION A-A
SCALE 1 : 3

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
	1	INITIAL BUILD		–
5407	A	RELEASED TO STANDARD	2/18/08	RBG

ITEM#	QTY	PART#	DESCRIPTION
3	1	112132	KIT,SHIPPING,TURNTABLE,2187-3.0
2	1	112131	SUB-ASSY,TOP,TURNTABLE,2187-3.0
1	1	111329	TURNTABLE,2187-2.0

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
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SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:
DECIMALS X.XX ± .015, X.XXX ± .005
ANGLES ± .5

	INITIAL	DATE
DRAFTING		
ENGINEERING	RBG	7/16/07

FINISH: NONE

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TITLE: TURNTABLE,3M,MD,ELECTRIC,METAL TOP

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SIZE	SCALE	DWG. NO.	REV.
D	1:8	2187-3.0	A

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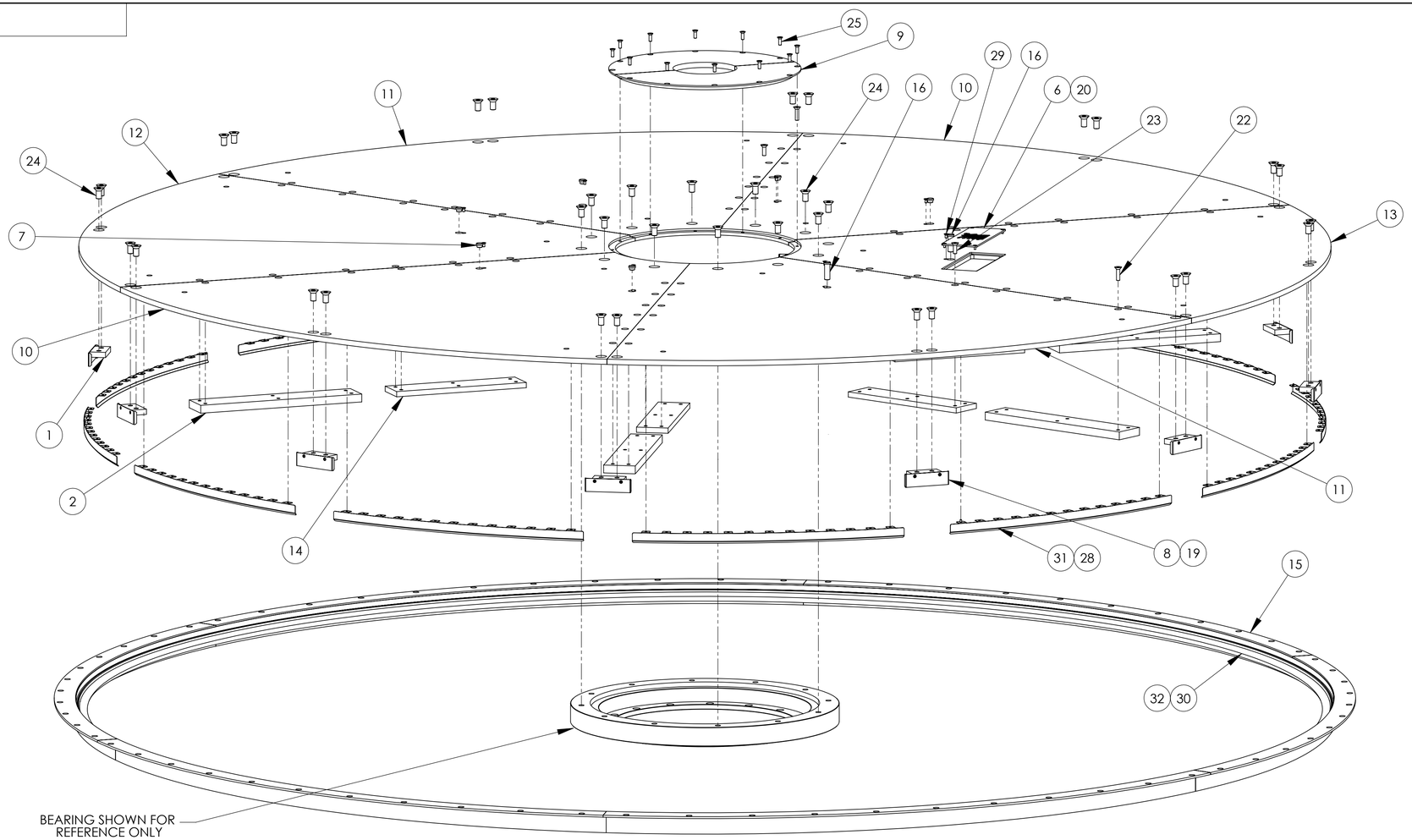
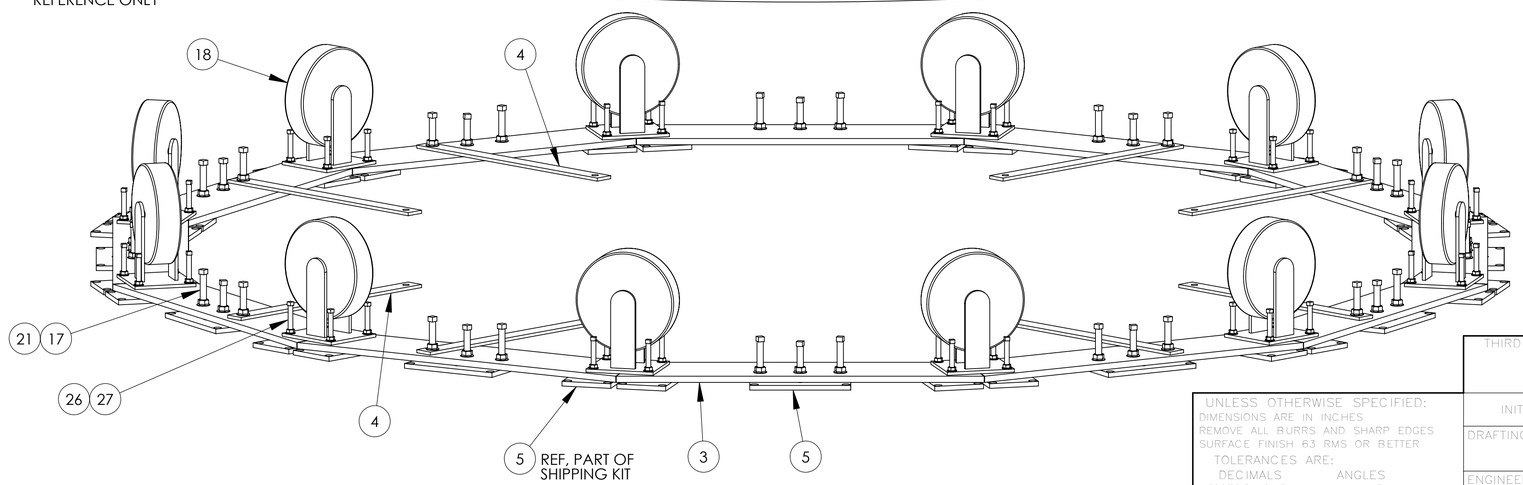
SHEET 1 OF 1

REF DRAWING

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
	1	INITIAL BUILD		–
5407	A	RELEASED TO STANDARD	2/18/08	RBG





ITEM#	QTY	PART#	DESCRIPTION
33	1	920192	LABEL,WARNING,GEARS BELOW TURNTABLE(NS)
32	96	910652	SCREW FH PHL ZN TAPTITE 6-32 X 3/8
31	12	112134	CONTACT STRIP,BRUSH,TURNTABLE,2187-3.0
30	8	109468	ASSY,BRUSH/HOLDER MODIFICATION
29	8	910930	SCREW,10-32 X 3/8,PHIL,FLAT,SS
28	156	910714	SCREW,6-32 X 1/4,PHIL,BIND,TAPTITE
27	48	910616	SCREW LEVELING 1/2-13 X 3 SQ HD CU
26	48	910615	NUT,3/8-16,HEX,ZINC,SERRATED FLANGE
25	12	910440	SCREW,1/4-20 X 3/4,PHIL,FLAT,SS
24	36	910413	SCREW,1/2-13 X 1.00,SH,FLAT,ZN
23	36	910373	SCREW,5/16-18 X 1,SH,FLAT,SS
22	36	910372	SCREW,5/16-18 X 1 1/4,SH,FLAT,SS
21	36	910367	NUT,1/2-13,HEX,SERRATED FLANGE,ZN
20	4	910241	SCREW,8-32 X 3/8,PHIL,FLAT,SS
19	24	910173	SCREW,6-32 X 3/8,PHIL,FLAT,SS
18	12	890668	CASTER,8" FIXED
17	36	890238	SCREW LEVELING 1/2-13 X 3 SQ HD CU
16	2	880316	PIN,CLEVIS,SS,1/2"O.D. X 1.5" LONG
15	6	705434	FLOOR FLANGE,TURNTABLE,3.0m,AL
14	6	112133	TIE BAR,INSIDE,TOP,2187-3.0
13	1	111988	TOP,SECT4,TURNTABLE,2187-3.0
12	1	111987	TOP,SECT3,TURNTABLE,2187-3.0
11	2	111986	TOP,SECT2,TURNTABLE,2187-3.0
10	2	111985	TOP,SECT1,TURNTABLE,2187-3.0
9	2	111333	RING,SPLIT,2187 TURNTABLE
8	12	110405	CONTACT FLAT,BRUSH,TURNTABLE
7	6	110059	PLUG,HOLE,TABLE TOP
6	1	108925	COVER,ACCESS
5	12	106789	FLOOR PLATE SPACER 2081
4	8	106733	ANGLE STRUT 3M 2087
3	12	106732	CASTER PLATE 2M 2087
2	6	106730	TIE PLATE 3m 2087
1	12	105813	TAB,TOP,2087

THIRD ANGLE PROJECTION

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SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:
DECIMALS X.XX ± .015, X.XXX ± .005
ANGLES ± .5

	INITIAL	DATE
DRAFTING		
ENGINEERING	RBG	7/16/07

FINISH: NONE

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TITLE: SUB–ASSY,TOP,TURNTABLE,2187–3.0

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SIZE	SCALE	DWG. NO.	REV.
D	1:6	112131	A

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